INTRODUCTION

Territory

The territory of the Havasupai in north-central Arizona comprises the broad drainage area of Cataract Canyon and the bottom of that gorge itself. From the viewpoint of the Havasupai village in the canyon bottom, this drainage area is a high plateau. It extends from the east where the benches of Coconino Basin give toward the Little Colorado River, to the Aubrey Cliffs on the west, these marking the descent toward the Colorado River. The northern edge of the area is the rim and the broken ledges of the Grand Canyon: the southern limit is marked by the heights of the San Francisco Peaks and Bill Williams Mountain, beyond which the country falls away to the south. This forms a winter range some ninety miles by seventy-five. 131 133

Cataract Canyon cuts across this plateau from Bill Williams Mountain on the south to the Grand Canyon. Near its northern end it is, like the Grand Canyon, a double gorge; first a mile wide canyon through the white limestone some twenty-five hundred feet deep, and then a narrower gorge three to five hundred feet deep, winding through the red sandstone in the bottom. The Havasupai village is located about six miles from the mouth of Cataract Canyon at the widest point in its bed where it is a quarter mile across. The bottom lands between the talus slopes are, however, only five hundred acres in extent. In effect the village is shut in on all sides by towering cliffs which can be scaled in but a few places. Northward, the canyon drops away by a series of nearly impassable falls to join the Grand Canyon. Beyond that lies mile on mile of broken ledge and mountain to the northern rim of the Grand Canyon. Egress to the south is by way of its tortuous ramified arms: Hualapai Canyon to the west, Lee Canyon to the east, and several more, Moqui Trail Canyon among them, further north. In effect, traveling to the north is next to impossible, and to the plateau above is so difficult as to make the isolation quite complete.

Several hundred yards above the village, Cataract Creek bursts from the bed of the canyon, gathers rapidly in volume, and rushes as a narrow erratic stream for two and a half miles to plunge in three great falls to the Colorado. This section is an oasis: irrigated fields and orchards stretch between the talus slopes; the stream is bordered by a dense growth of willows and cottonwoods; mesquite and other bushes cover the slopes. The red sandstone benches above this are arid—except for a few springs, as is the bed of the canyon above the village. Here grow 133 137 [241]

1: Spier E-5 (1918) 1928
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Havasupai

ECONOMIC LIFE

Agriculture

The Havasupai are largely agriculturalists. Their interest centers so firmly in their fields, and comparatively so little attention is given to wild products, that the loss of a crop may mean a famine year. In fact, although the quantity of wild seeds and plants that is gathered is considerable, it is used chiefly during the winter to eke out the field products. The Havasupai are inordinately proud of their abundant harvests and their superiority in this regard to the Walapai, Navaho, and Paiute. Harvest is a time for jollification, when their neighbors come to share their bounty. So great is their interest in their fields that even today, when remunerative employment is to be had on the plateau, so Mr. C. H. Gensler, the former agent, informs me, men will leave their work, with its ready money, to tend their crops.

The fields[1] about the village are as extensive as irrigation will permit, so that, depending on the location of the erratic creek, all of the one hundred tillable acres are farmed. A new field is cleared of brush by grubbing and burning it. Trees are felled by burning their bases; the charcoal is not chopped away, nor are trees ever girdled. The fields are fenced.

At present there are two dams supplying water to the irrigating ditches; the first is located well above the village, whence the main ditch follows the east canyon wall as far as Camp 29 (see map, Fig. 50); The second is at the bend below Camp 26 whence its main ditch parallels the creek in the direction of Camp 51. The dam, which extends halfway across the shallow stream is built about a heavy log set well into the bank, where it is held in place by stakes driven on the down-stream side. The bank is roughly faced with stones to prevent the log washing out. A series of poles are driven obliquely along the upstream side, their upper ends resting on the log. Fascines of willows, about 1.5 m. long and containing stones, are laid end to end along the base of this slanting face, with a second set laid in front on the bed of the creek breaking joints with these. A second tier of fascines might be built above these. Willow brush, placed transverse to the stream, is then piled thickly on the face of the dam to the top. The rapidity of the stream is such as to drive considerable water behind this scoop into the main ditch. Changes of water level produced by every little storm necessitate frequent renewals of the dam. Constant attention is also necessary for the irriga-

[1] There seems to be no word for cornfield; one speaks of going to his corn, even if the field contains a mixed crop.

1:Spier E-5 (1918) 1928
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312 tion ditches because the sand in which they are built is so light that they easily break.

The main ditches are perhaps two to three feet deep; the others are quite shallow. The ditch system is not complex because most fields that are irrigated lie directly under the main ditches; others are fed by a few laterals. Maintenance of the dams and ditches is not a community affair, but devolves on those whose fields are supplied by the particular dam or ditch. They are dilapidated most of the time, being repaired only as needed. This is to be expected because the material is so light as to wash out easily and it would be futile to keep them up when not in use. There is no set regulation for the use of the water. The supply is large, the need is small, and apparently there is little friction over [578] rights to its use. Yet quarrels have arisen from this source.

241 Planting is a family occupation, even the children helping to dig holes. Garcés says:—

592 I had much complacency to see that as soon it was dawn each married man with his wife and grown sons went forth to till his milpas, taking the necessary implements, as hatchets, dibbles (coas), and hoes, all of which they procure from Moqui.[1]

As a rule each family plants as much corn as possible. Corn, beans, and squash are the staples, the year-round food. Corn (*teyă'dj*) is not planted 243 deep; 5 to 7.5 cm. being usual. Straight lines for the rows of hills may be drawn with the foot; their orientation is immaterial. Kneeling, the [412] first hole is scratched with the planting stick (*hwdlid*) in the manner of a canoe man wielding his paddle. This is a buckthorn branch (*Condalia lycioides* var. *Canescens* (Gray) Trel.), 2 cm. in diameter, 65 cm. long, with one end cut wedge-shaped.[2] The soil is loosened to a depth of 20 cm. and eight or ten kernels dropped in. Before putting the corn in the first hole, the planter prays:—

[539] mĕdjpák	teyădjnehána	owi
growing	corn good	I do it.

"Grow good: when your stalk grows, grow tall: grow like the mythic corn." Then he drops the kernels into the hole and chewing another, blows t toward the mythic corn, two white marks high on the canyon wall. These represent the two original ears given by the twin culture heroes.[3] Filling the first hole, he takes two short steps forward, kneels, and digs a second, and so on. The second row parallels this

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[114] [1]Couse, 345. A later statement (438), that tribes upstream from the Mohave lack crops, must be taken to mean that the Walapai and Havasupai had less than the Mohave.

[2]Cushing, (a), 550, notes the use of a planting stick provided with a footrest, but my informants denied this.

[171] [3]The Zuñi also pray at the first planting [Cushing, (d), 178–179].

1: Spier E-5 (1918) 1928
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away and the seeds scraped out and collected. After further drying, the flesh is sliced spirally from side to side, beginning at the stem end, in a strip 2.5 to 5 cm. in width. This coil, 1 to 1.5 m. long, is hung from a pole to dry in the sun. While it is still pliable, it is folded back and forth on itself into a bundle (*hamtekwt'lîvd*), 30 to 45 cm. long, and bound with one end of the strip. This is set aside to dry thoroughly before it is placed in the storehouse for winter use. Squash so dried will keep through an entire year. Melons are also grown. 251

Sunflowers (*dk'ŏld*) are grown for their seed. Cotton (*Gossypium hopi* Lewton) is raised from seed obtained from the Hopi; the only use for this product is in the strike-a-light. The seeds of wild food plants are not planted; some, such as pigweed, grow in the fields. Peaches and figs, modern foodstuffs, are eaten fresh. Peaches are also torn in two and pitted, while figs are opened, before they are spread on the rocks to dry. 241 [249] [372] [251]

Two varieties of tobacco are known, *úwi*, and *kaθŏ'du„lu'va* (Coyote's tobacco; *Nicotiana trigonophylla* Dunal). Myth has it that the second was grown by Coyote for his own use. Both grow wild on the plateau and in the canyon above the village: their leaves are similar, but the smoke tastes somewhat differently, according to the natives. Tobacco (both varieties?) is grown only on the plateau. A mesquite tree is cut down and burned. The tobacco seeds are thrown into the dead ashes (the soil is not dug up). Willow is not used as a substitute. 249

Wild Food Products

These are a valuable adjunct to the food supply, especially from the autumn until spring during the residence on the plateau. During this period they lead a wandering life, families going off in the fall to a place where someone had reported piñon nuts lying plentifully on the ground; winter finds them to the east, hunting in the Coconino Basin, dropping down to the benches of the Grand Canyon in the spring for mescal, and so on. Women and children are sometimes left to gather seeds while the men go off to trade. 221 222 [462]

Mescal (the agave plant), which grows on the canyon benches, is ripe in May when the flower stalk is 30 to 60 cm. tall. The plant is severed entire by pounding a chisel-shaped buckthorn stick (*lŏp'ŏ'l*) about 1 m. long, 3 cm. diameter, against its base. The outside leaves of the inverted plant are trimmed of their green portion with a special hatchet (*dgwidjd*). This consists of a broad stone blade set in a slot midway in the length of a short handle, 30 cm. long, (sometimes of piñon wood), where it is held fast with glue or pitch and by lashings. A load of [412] 252 [412]

1: Spier E-5 (1918) 1928
NT14 Plateau Yumans NT14
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stewed. It may be placed in warm water to simmer; then bean flour is added to thicken the stew. Squirrels should be eaten fresh. The viscera are removed, and if it is to be boiled, the skin, head, and tail as well, but not if it is to be roasted. Rabbits are roasted in the ashes and possibly in roasting pits. Doves and quail are eaten, but only infrequently although they abound at harvest time. Only quail eggs are eaten. 252 262

Fish are neither caught nor eaten. (These live in the Colorado but not in Cataract Creek.) Fish are not tabooed, but the Havasupai are afraid to eat them because they never have eaten them. Snakes, frogs, and lizards are not eaten; in fact, they mock the Walapai for eating the last mentioned. [226]

Most cooking is done out-of-doors and meals are served there also. The cooking vessels, trays of fruit and bread, and vessels of drink are placed together on the ground. A vessel of ground salt stands near by, but very little is used, and practically none at all in the process of cooking. The whole family groups itself about these, within easy reach of the one or two *pièces de résistance*. Bits of meat are fished from the stews with fingers, twigs, or knives, while the mush is scooped or sopped up with a bit of bread, flat sticks, little horn and wooden spoons,[1] or even with three fingers. Eating manners are fairly decorous by our standards. Even small children help themselves, but forwardness, quarreling, and especially pilfering before meals, is met by sharp reproof. As a rule women and children eat with the men, but when there are male visitors, the former often wait their turn. In such a case, for example at a dance, the men leave a fair share of the food As a rule three meals are eaten during the day, but that at midday is somewhat inconsequential. The others are substantial; breakfast on rising, and the last meal after sundown. Everyone eats irregularly throughout the day, for to whatever camp one goes there is always cookery in progress; corn roasting, a load of peaches brought home, and so on. While considerable is eaten at each meal, no food is ever wasted, and the natives do not stuff. Those who have seen the Zuñi in the Hopi villages ridicule their habit of expressing thanks after a meal. [252] 264

Comparative Notes

Havasupai agriculture is one of the few traits shared with Pueblo culture. The general distribution of cultivation through the Americas is well known, but there has been no attempt at fixing its northern limits in the Southwest in detail. 171 241

[1] Cushing, (a), 550.

1:Spier E-5 (1918) 1928
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In northern Mexico cultivation has been recorded among several modern tribes: Huichol, Cora, Tepehuane, Tarahumare, Tepecano, and Opata.[1] There are records of the Jumanos in eastern Chihuahua in 1582, the Guaymas, a southern Piman group near the Seri ("land-tillers on a very low scale"), and the Sobaypuris, Pimans on the Rio San Pedro.[2] Intensive agriculture is characteristic of the Pueblos.[3] It would be interesting to know the extent it was followed in such outlying communities as Taos and Picuris. Pima, Maricopa, Yuma, Cocopa, and two groups near the last, Talliguamayque and Cajuenches, Mohave, and Navaho raised crops in abundance.[4] The Havasupai and Papago are agriculturalists to a lesser extent, both subsisting in some degree on wild seeds. But cultivation is greater among them than among the Jicarilla, and Western Apache, Apache-Yuma, Chemehuevi, Shivwits and Kaibab Paiute, and Walapai.[5] These tribes mark the limits of agriculture in the west. It is known not to have extended into California, the Basin, or into the southwestern Plains. In fact for certain tribes in the immediate vicinity of those practising the art we have specific information that it is lacking; to wit, Mimbreños and Tonto Apache, Moapa Paiute, Akwa'ala and Halyikwama of Baja California, and the Seri.[6]

Perhaps irrigation was in all these cases part of the agricultural technique, but it is not recorded. It is the practice of all the Pueblos, the Navaho, Havasupai, Shivwits, Kaibab (?), Pima, Maricopa, and Cora. The Mohave utilization of the overflow of the Colorado corresponds to the planting of other tribes in dry washes or creek bottoms.

The planting sticks and hoes offer some comparative points. Planting sticks are of two types; one a straight stick having a wedge-shaped point, the other similar but provided with a projecting footrest near the lower end. The first type is that of the Havasupai, Hopi, Pima, and probably Shivwits. The Zuñi use the form with the footrest, while the Navaho use both. The Havasupai hoe is one form of a general type: a flat stick with its blade and handle in one plane, approximating a weaving sword in shape, although there is considerable variation. This type is also used by the Pima, Mohave, Hopi, Navaho, and Zuñi. The last two also use a hoe like our own, a wooden blade or elk scapula set

[1] Lumholtz, (a), 4; Bandelier, (a), 60, 93, 99; Bartlett, I, 444; Mason, J. A., (d), 135.
[2] Bandelier, (a), 60, 76, 101.
[3] Cushing, (d); Hough, (e), 238, 239, Pl. 10.
[4] Bartlett, II, 173, 180, 214, 232, 263; Pattie, 121, 131-2, 144; Russell, (d), 82-92; *Handbook of American Indians*, I, 886; Whipple, Eurbank, and Turner, 123; Kroeber, (a), 276; Letherman, 288; Franciscan Fathers, 204; Lippa, 50; Stephen, 354; Bandelier, (a), 104, 176.
[5] Gaillard, 283; *Handbook of American Indians*, I, 632; Whipple, Eurbank, and Turner, 120; Corbusier, 338; Lewis, (h), 269; Ruhle, 67, 68, 74, 78; Whipple, Eurbank, and Turner, 32, report agriculture as the main pursuit of the Chemehuevi, but this does not seem likely.
[6] Bartlett, I, 327; Whipple, Eurbank and Turner, 14; Kroeber, (h), 476; McGee, 180.

1: Spier E-5 (1918) 1928
NT14 Plateau Yumans NT14
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DANCES

Annual Dance

The one general dance (*yimdga*) of the year is hardly to be classed as religious, for it serves a social end, yet it is also a means of obtaining rain and prosperity. Certainly the pleasure element is uppermost for the majority of those attending. It is performed at the end of August or the beginning of September, when the harvest is gathered. At this time Navaho, Hopi, and Walapai visitors come to share the abundance and to trade, the several days of festivities furnishing the principal diversion of the year. In 1918 a somewhat impromptu affair was given on August eighteenth and a more extended dance in the middle of September lasting two days and nights; in 1919, the dance was held September twelfth to fifteenth occupying three nights and the intervening days.

The dance of August 1918, although held by day, was typical, save in one respect, namely, that most of the active men and women were absent in attendance on a mourning ceremony given by the Walapai. The dance ground, a disputed tract in the middle of the village, was voluntarily cleared by some boys, who piled the brush about the edges; this was the only approach to an enclosure. People began to arrive in the early afternoon, the men congregating apart from their families. Curiously enough, although the women sat together they formed three slightly separated groups; those from camps 7–18 (see map, Fig. 50) were at the southern end, camps 44–53 at the north, with the families from the middle section of the village between. Clearly this was not only an expression of the relationships prevailing between neighbors, but also of a degree of cohesion among neighbors as such. The older men smoked; the younger played games of chance; the women, when not engaged in preparing food for the subsequent feast, prepared basketry material. By midafternoon the entire village, with the exception of a few old women attending the sick, had arrived. Sinyella thereupon directed that a space be cleared to receive the food, arranged part of it that the men might eat, and distributed the remainder among the groups of women and children. At its conclusion, Sinyella and Manakadja, the only chiefs present, rose from their places before the men and addressed a moral discourse to the women and children, stating as well, that although the dance had not been given for several years, on this occasion it should be resumed in its old form. At this time, the heat of the day abating, the dance commenced.

2:Iliff Y-5 (ca.1901) 1954 NT14 Plateau Yumans NT14
Havasupai

most of the houses were rectangular or dome-shaped. Their construction involved no expense. A man needed only poles, brush and dirt; by exchanging work with neighbors, his shelter was soon completed. There were no windows; the low doorways were closed with a blanket or a rough board door, hung on leather hinges.

Everywhere men, women and children were working in their gardens, stirring the soil, planting the seed, irrigating, weeding and cultivating the growing plants, although the sun's rays would not reach them for hours. They boasted that they worked in their gardens and orchards when it was "little light"; then the canyon was cool, the soil soft and pliable.

The fascination of watching them grow their food, preserve it and store it far outweighed my interest in gathering dry statistics, but Mr. Ewing wanted facts and figures. I knew I would encounter difficulties in getting the necessary information, especially from the older people who spoke no English.

At Chickapanyegi's home I watched the family at work on their small plot of ground. Chickapanyegi was irrigating his patch of corn. When he heard me approach, he turned, a quizzical, batlike expression puckering his countenance. The Indians must have noted that same expression, for his name, Chickapanyegi, meant "bat."

Here, again, the people appealed to those benevolent, unseen forces, especially in the first planting of their corn. The planter knelt on the ground, struck a wedge-shaped stick deep into the earth to loosen the soil, then offered a prayer that his corn might grow well, and dropped the seed into the place he had prepared. This done, he made an offering to two white blotches on the wall of the gorge—the first mythical ears of corn given to the people by their gods—by blowing toward them one grain of corn. At the conclusion of this sacred rite, the planting of the remaining ground was done in the usual manner.

Chickapanyegi's wife was weeding the plot, while his son, Jess, one of my pupils, was stirring the ground with a shaped piece of wood which he pushed through the soil like a small plow.

241 Their garden was lush with corn, beans, pumpkins, watermelons and sunflowers that grew large seed heads. Purple figs and red-cheeked peaches grew at one end of the plot.

Chickapanyegi worked unhurriedly, pushing the dirt aside with his bare toes to open the floodgates, letting the water gush through to fill the ditches that ran between his rows of vegetables. Toes did the work of fingers, opening ditches or packing the soil to close them, picking up sticks and stones and piling them ready to be removed. Here was a way of life new to me and very intriguing. 000 The Walapai that I knew lived in idleness on bare sand, accepting government rations, a few working at odd jobs. These people produced and stored food, not only for the immediate future, but for years ahead. At one time, the Walapai, too, had been self-supporting and self-sufficient; then agents of the government had come, using rations as a buying power, and had established controls that crushed initiative.

241 412 The Havasupai had devised their own garden tools, even making a spade by fashioning the blade and handle from a long, flat piece of wood. They used the shoulder blades of horses or anything they could get that would loosen the soil or chop weeds. Obviously they were greatly handicapped by these primitive tools; sticks, bones and toes were poor substitutes for spades, hoes and rakes. The Indians themselves restricted production by refusing to till inherited land until it had lain fallow for a year or more. The spirit of the dead might at any time return to its former home, so they would not make immediate use of such land, partly through fear, but also to show respect to the former owner. Thus many acres of fertile soil lay fallow, necessitating more intensive cultivation of the land in use.

241 Tending their crops and preserving their food was the main object in life for the people of this village. Always the crop was divided into portions: some for eating, some held for an emergency, but the best kept for seed.

342 674 Chickapanyegi's rectangular house stood near his garden. The flat, brush-covered roof, topped with earth, and the sides, thatched

Gilliff Y-8 (ca. 1901) 1964 NT14 Plateau Yumans NT14
Havasupai

camera they feared, so leaving it in a shady spot, I went over to where they crouched behind a boulder and asked them why they ran. With much excited sputtering they made me understand that if I took a picture of them, their souls would go into the picture. One could not live without a soul. They illustrated with exaggerated gestures how dead they would be when their souls left their bodies.

I retrieved my camera and opening and focusing it, tucked it out of sight under my arm. When they returned, talking and laughing, I snapped the picture without their knowledge.

Families who owned large plots of ground had several storehouses, some as many as five. Regardless of how the land had been distributed when the People of the Blue Water settled in the canyon, through inheritance some individuals had acquired more land than they could till, and it was loaned or rented to friends or relatives. There were a few whose plots were no larger than the floor of a room, but every family had at least one storehouse tucked away in a crevice in the wall.

It was late afternoon when I returned to the school and wrote my report. I had been so intent on learning how the people raised their food and preserved it that I had not measured a foot of ground, nor counted the members of the tribe. Besides, what the Commissioner must know, I finally decided, was that the Havasupai needed garden tools; that the school children ate out of doors in all kinds of weather, and that their food was cooked on a range protected only by a bush. These things he could do something about. Here is my report, as it appeared in the *Annual Report* of the Department of the Interior for the year 1901:

SIR: I have the honor to submit the annual report of the Havasupai tribe and school for the fiscal year ending June 30, 1901.

Havasupai Tribe—The Havasupai is entirely self-supporting. He depends on the products of his farm for his livelihood. He is proud of his gardens and his orchards, but prouder still of the fact that he labors. Living on the banks of a clear, sparkling stream, he is never troubled by crop failure. He utilizes the water of the stream for irrigating purposes and an abundant crop is assured him;

Elliff Y-5 (ca. 1901) 1954 NT14 Plateau Yumans NT14
Havasupai

rigating purposes and an abundant crop is assured him. The almost perpendicular walls of the canyon, which he has made his home, are lined with storehouses which in the autumn he fills with corn, beans, and other products of his labor. 241

The most discouraging feature at present to the Havasupai is the fact that many of them have no farming implements. The farmer often loans them plows and hoes, which are always promptly returned. When unable to borrow implements, they laboriously loosen the soil with sticks. If farming implements were furnished them, they could easily cultivate all the land to which they have access. Much labor and time would thus be saved, and what is still more important, their surplus products thus gained could be marketed, which would enable them to provide themselves with warm clothing for the winter months. [412]

All of the Indians of this tribe dress in part in citizens' clothes, and most of them are quite willing to adopt the ways of the white man. They depend very little on the professed abilities of the medicine man. . . . As they come in contact with very few white people, except those employed at the school, very few of them speak enough English to make themselves understood. 291 177 191

Havasupai Day School—This school has a capacity of 46, but has been crowded beyond its proper limit, having an average attendance of 71. 812

We have a good stone school building, but it is not large enough to accommodate the school. The pupils' lunch is served under a cottonwood tree, which fails to protect them from the heavy summer rains we are now having. . . . As there is an abundance of stone in the canyon it would cost but little to build a dining room with a wareroom attached, where the supplies could be safely stored.

Work in the laundry and sewing room is ably conducted. Both boys and girls are detailed to assist in cooking the noonday lunch, and, under the supervision of the cook, do excellent work.

I trust that either 20 of the largest boys and girls will be transferred to the Truxton Canyon Training School when it opens September 1, or a kindergarten department will be added to this school, as it is impossible for one teacher to instruct 71 pupils in a creditable manner.

Permit me to express my appreciation of your support and encouragement.

Very respectfully,

FLORA J. GREGG, *Superintendent*

2:Iliff Y-5 (ca. 1901) 1954 NT14 Plateau Yumans NT14
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from the bed of hot coals. Broken pieces of stone always had to be picked from the food. So these cumbersome vessels were discarded as soon as other containers were available. But the horn spoon, shaped from the horn of mountain sheep, was still in use. Making it was a tedious and lengthy process. The horn was soaked in water, then buried in moist sand until somewhat softened. The next steps —heating, oiling and fashioning the horn into a spoon or ladle— required the skill of long practice. Tin cups, obtained at the trader's store in Seligman, were gradually supplanting the horn spoon, and another skill would soon be forgotten.

In a report on conditions in the canyon for the year 1898, the acreage in cultivation and under fence was estimated at three hundred twenty-five. One thousand bushels of corn and fifty bushels of wheat were grown that year, in addition to an abundance of vegetables and fruits. And the tribe had a cash income of four thousand dollars. At that time, tribal affairs were managed almost wholly by the chief and head men, although the school had been in operation for three years. From the seeds their gods had given them, the Havasupai had reaped their independence.

They preferred their old system of barter and trade to a cash sale. The Navaho were silversmiths and weavers of warm blankets, while the friendly Hopi and Walapai had ponies or goods to trade. A Havasupai could measure out a small tray of beans and—after endless good-natured bargaining—exchange his beans for a fine Navaho blanket. Two spirals of their dried pumpkin or squash had the same value.

Every man of consequence kept a pony in his dooryard and sprang to its back to ride the short distance to a neighbor's wickiup. So horses were eagerly sought. A Hopi pony cost a large well-tanned buckskin or as much shelled corn as a large burden blanket could hold. A man traded, or made gifts, for the girl he wished to marry, presenting her parents with ponies, blankets or grain to the value of about twenty dollars, if the girl was popular. Ten dollars in trade was a fair price for a lazy girl.

The men, of necessity, had developed skills. The tribe needed to

3:James T-5 (ca. 1900) 1903
NT14 Plateau Yumans NT14
Havasupai

133 361 layers are of differing thicknesses, wind in and out, as if following the meandering course of the stream, and over this the perfect blue of the Arizona sky. These make the most marvellously picturesque dwelling-place of America. Even Acoma's mesa heights and Walpi's precipice-surrounded walls are not more picturesque, and when you add the charm of the verdure nourished by the sweet waters of the Havasu, the picture is complete in its unique attractiveness.

Not even in the Green Emerald Isle, or the county of Devonshire, or the vineyards of France, is richer verdure to be found than fills up the open space between these great walls. Willows reveal the winding path of 133 ● 241 the Havasu, and everywhere else are the fields of the Indians. Patches of corn, watermelons, squash, canteloupes, beans, sunflowers, chili, onions, and alfalfa, with 311 here and there peach, mesquite, and cottonwood trees, abound. As a rule these patches are protected and set off one from another by hedges of wattled willows or [487] fences of rudely placed cottonwood poles. Through the fields trails meander in every direction, and they are [312] also "cut up" by irrigating ditches. Some of the better irrigated fields are divided into small sections — like the squares of a checker-board — in order that the water may be more systematically distributed.

342 The peaceful *kawas* of the Havasupais nestle here and there among these verdant growths. Themselves covered with willows, it is often hard to distinguish them from the trees, were it not that at our approach small [291] groups of men, women, and children, some clad in flaming red, others in all the colors of the rainbow, and some in even less than Mark Twain's descriptive smile, stand forth and reveal the dwelling-places. Now and again

4: Smithson E-5 (1951-1958) 1959 NT14 Plateau Yumans NT14
Havasupai

133
311
241
251

Fig. 2. Havasupai fields and orchards in Cataract Canyon, looking northwest. Havasu Creek sweeps around the base of the Wealeva at left. The summit of the Redwall forms the Esplanade, a broad terrace, seen as center and right horizon. The Whitewall rises above the Esplanade at left. Caves or rock shelters formerly used by some families and rock structures used for food storage were located at top of steep talus at the base of the Redwall.

At an elevation of 4000 ft., the Esplanade, 1 mi. wide in places, crumbles away in ragged steps through the upper strata of the Supai formation. Abruptly, vertical walls break away, dropping 500 to 800 ft. and forming the narrow inner gorge of Cataract Canyon. The Supai formation, composed of sandstone and shale, locally is called the Redwall in reference to its color, which contrasts with the Whitewall above. This is not to be confused with the geologic designation of the Redwall limestone, an underlying formation exposed downstream from Supai village in the area of the waterfalls. It is from the crumbling top of the Supai formation that storms wash huge boulders which tumble and crash to the canyon below.

133 [103]

The Factor of Water Supply

The existence of permanent water sources determined the residence pattern. The Havasupai have been described as seminomadic, but a more accurate term might be seasonally migratory. On the plateau, families sometimes built temporary brush shelters when they were harvesting pinyon nuts or other occasional crops, or when the tribe assembled for ceremonial or other purposes, but for the most part, families erected permanent structures to which they returned year after year as long as the house was deemed suitable. The presence of water within a reasonable distance was the determining factor in the location of both permanent and temporary camp sites, excepting those of the most transient nature. There were a number of permanent springs known on the plateau, and the karst topography provided natural reservoirs for retaining precipitation. It is speculated that the prehistoric Havasupai, with the karst examples before them and having the engineering skill and industry to build and keep in constant repair the canyon irrigation system, probably built dams on the plateau to impound water at some of the sites now similarly used by them or neighboring ranchers.

221 312 [342] [361] [241]

Water sufficient for irrigation was present at a site called Indian Gardens, which was located a short distance below the canyon rim on Bright Angel trail and which was farmed by the Havasupai in early historic times. Prospect Valley, west of Cataract Canyon, also was farmed (Spier, personal communication, 1957). In addition, several other areas, including one on the floor of Grand Canyon proper, were farmed by means of irrigation.

241 312 311

In Cataract Canyon,* a short distance above the village area, numerous springs emerge on the canyon floor, flowing over impervious shales in the Supai formation. The water is highly charged with minerals, travertine being deposited along the stream's course. This deposition accounts for some of the erratic behavior of the creek. Masses of crumbling travertine jut from the ground here and there, evidence of past shifting of the creek channel. Havasu Creek,* swollen by melting snow or desert cloudbursts, churns its banks into mud, sometimes sweeping away a man's field and the ground beneath his house.

133 312

*The names, Cataract and Havasu Canyon and Cataract and Havasu Creek, appear interchangeably in the literature and all four terms are in common usage among residents of the area. [103]

[Text continues on page 10]

4: Smithson E-5 (1951-1958) 1959 NT14 Plateau Yumans NT14
Havasupai

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241
312

Fig. 6. Fields in Cataract Canyon. Irrigation water is diverted from Havasu Creek onto fields by means of a system of laterals and smaller ditches. Individual plots are dyked for flood irrigation.

plums, almonds, and pomegranates, there being only a few trees of the latter three kinds. 245 177

Whiting lists the following aboriginal cultivated plants: corn, pumpkin, squash, Hopi sunflower, three varieties of beans (tepary, kidney, and lima), cotton, and gourds. Introduced plants include peach, pear, plum, apricot, fig, apple and walnut trees, watermelons, cantaloupes, blackeyed peas, devil's claw and alfalfa. Plants introduced, but rejected or used very little, are onions, chilies, sweet potatoes, tomatoes, peas, wheat, and cherry and almond trees (Whiting n. d., 80). 241 177

Spier (1928, 108) reported antelope to be the most plentiful large game animal, with mountain sheep and deer also in good supply. Mountain lions were killed occasionally, but the meat was generally abhorred. Smaller game included cottontails, jackrabbits, squirrels, and various kinds of birds. McGregor (1951, 17) reports predators now present on the plateau are lions bobcats, coyotes, badgers, and probably foxes. The Havasupai are now restricted to hunting deer and antelope only in the legal season. Rabbits are an occasional item in the daily fare, but most meat is obtained by purchase from a store or by butchering Havasupai-owned beef. The Havasupai did not eat fish, and, although Havasu Creek has been stocked several times, few Havasupai will eat fish even today. Apparently, the next storm following introduction of fish kills them or washes them down to the Colorado River. 136 262 [224]

The Reservation and Its Administration

The original Havasupai Reservation, established in 1880, consisted of an area 5 mi. wide by 12 mi. long lying on the floor of Cataract Canyon and the adjacent Esplanade. In 1882, the reservation area was reduced to 518.6 acres located entirely within the confines of Cataract Canyon. In 1940, four sections of land on the plateau, outside the National Forest boundaries, were added to the reservation to give the Havasupai water rights on various springs used by their stock. Horses and cattle owned by the Havasupai graze in the Grand Canyon National Park, which completely encompasses the reservation proper, and also on National Forest lands adjoining Grand Canyon National Park to the west and south (Ladd, personal communication, 1952). 657 131 [423] [231]

Government Services

The Office of Indian Affairs administrative headquarters, located almost 100 mi. away at Valentine, Arizona, is the Truxton Canyon sub-agency, which also serves the Walapai, Yavapai, and Camp Verde Apache. A resident agent at Supai acts in an advisory capacity to the tribe and is in charge of government-owned property on the reservation. A sub-agency was first established in Cataract Canyon about 1895 (Whiting n. d., 21). 657

The Economy, Old and New

The Precontact Pattern

Before pressures of the white culture were felt, the Havasupai wintered on the plateau. Men, singly or in small groups, went there on summer hunting trips. Whiting (n. d., 61) suggests that the Havasupai "conceive of their agriculture as something incidental, a supplement to a nonagricultural way of life." Whiting points out that even today, when farming is virtually their only resource, Havasupai do not take pride in their fields as Pueblo farmers do, regarding the land rather as a confining element which restricts their freedom. He states further (p. 53) that, in the prehistoric economy, neither agricultural produce nor the wild food supply was available in sufficient quantity to sustain the population, and that it was essential for each family to supplement hunting and gathering activities by farming. This view evokes the question of how the neighboring Walapai survived in a similar environment with virtually no farming.

Whiting's thesis is in contradition to Spier's that the Havasupai are so largely agriculturists that the "loss of a crop may mean a famine year" (Spier 1928, 101). Wild food plants were primarily a winter supplement to field products. Spier notes further (p. 108) that hunting is "a man's second occupation, for he relies mainly on his field products."

Perhaps the difference Whiting discerns between Pueblo and Havasupai attitudes toward farming is in part a result of natural environment. Certainly, Pueblo farmers must pit their ingenuity against desert aridity to win a harvest, while a seed dropped in a Cataract Canyon field will grow with only occasional attention from the farmer.

When adverse conditions brought Havasupai subsistence to a dangerously low level, as occasionally happened, some families would go to live with friends or relatives among the Hopi and Walapai. In turn, the Havasupai were hosts to families from both these tribes in years of bountiful harvest.

Spier (1928, 99-100) reported that the Havasupai journeyed from the plateau to the canyon in early spring, planting activities beginning in mid-April. In summer, everyone, except those who were away on trading trips, lived in the canyon village. Corn ripened for use by the middle of June, and the harvest continued until September, when other domestic crops and wild plant foods were also harvested and prepared for winter storage. By the middle of October, family groups were drifting back to semipermanent winter camps on the plateau.

When families were camped in Cataract Canyon, women made frequent gathering trips to the Esplanade. A number of springs there served as focal points for camps of certain families. Ownership of the various springs was vested in specific individuals, and both the springs and the surrounding land were jointly held.

The siblings of a child's parents have no special institutionalized roles in connection with the child, but the infant's father's sister or his mother's sister may enact the role of the maternal grandmother at his birth if the grandmother is absent or deceased. Also, an orphan or an illegitimate child may become the ward of a paternal or maternal aunt or uncle. An orphan sometimes becomes the ward of an adult sibling, of a sibling of any one of his four lineal grandparents, or of another distant relative. 604 [848]

Terminology for parallel cousins coincides with that for siblings. Regardless of residence, parallel cousins are considered almost as close as siblings, but they are particularly close if they grow up in the same camp. Marriage with both parallel and cross cousins is forbidden as it is with any recognized genetic relative. If a younger sibling of a child's father or mother happens to be of the same age and sex as the child and is a member of the same residence group, the association may lead to a bond of mutual regard comparable to that between parallel cousins. 605 [582]

Children are instructed by their parents and grandparents in their economic and social roles. Verbal instructions are given when a child is asked to perform a task, but he learns largely from observation of, and participation in, family and tribal activities. The manner in which a child's parent of the same sex does his work is held up to the child as a model of the behavior he is expected to learn. In all verbal instructions, one theme is stressed and reiterated; both girls and boys are admonished to be industrious. The exhortation is phrased in the negative, however. "Don't be lazy. If you lie around all day, your family will have nothing." 861 867

While hunting and gathering are no longer significant activities, dependence upon agriculture continues. In recent years, since mechanized methods of preparing the land for planting have been adopted to some extent by tribal members, operation of farm machinery has been limited to men. Formerly, men and women shared all phases of gardening with the exception of irrigation, which was restricted to men. These changes have reduced the economic contributions which women make directly in obtaining the family's food supply with the exception of those who become wage earners. Consequently, little girls spend much less time helping their mothers in gathering and gardening activities than once was necessary. 241● 462 [177] [257]

The former pattern of instructing a child in his primitive technological roles has become less significant relative to his welfare and existence as an adult. Factors which have a bearing upon this cultural change are: (1) establishment of the Havasupai Indian Reservation, and increasingly permanent residence thereon due to depletion of natural resources; (2) subsequent partial dependence of the Havasupai upon financial aid from the Office of Indian Affairs, and (3) school attendance. 178 182 861

Much of a girl's role is outlined for her indirectly. Children of both sexes share their games and, to some extent, their work. Verbal definition 861

Materials used for coiled basketry are more carefully prepared than those for twined baskets. Both warp and weft twigs are denuded of bark. The weft twigs are split into three strips in the same manner as for twined baskets, and the pith is carefully scraped off and both sides of each strip scraped smooth. In addition, each weft strip is sized by drawing it through a hole punched in the lid of a coffee can or something similar. One weaver used a gradation of five or six holes for sizing strips for miniature baskets 2 to 3 in. in diameter up to trays 1 ft. or more across. 285

Whiting (1953, 84) identifies the materials used in basketweaving as follows: For woven elements squawberry is preferred; cat's claw is strong, and cottonwood is considered inferior. For rims, service berry, Apache plume, and mesquite are favored. For decoration, squawberry and devil's claw are used. Spier (1928, 128) cites Acacia greggii (cat's claw) as the best material for twined baskets and notes (p. 133) that cottonwood is used for coiled baskets. Materials observed most frequently in use in 1950 were those noted by Spier. [824]

Women also wove sleeping mats, but they are no longer used. Cradleboards, also made by women, continue in general use.

The Food Complex

Cooking and storage methods, together with degree of utilization of the available food supply, furnish an excellent index to feminine ingenuity and readiness to accept new ideas. Cooking methods and exploitation of the environment for foods, and probably food storage also, are traits extant in every culture. 153 252

Food Sources

The Havasupai food supply under primitive conditions was sometimes meager but included much variety. Cultivated foods included corn, beans, squash, peaches, and sunflowers, and a wide variety of wild food plants were harvested for seeds, leaves, or roots. Foods were prepared singly or combined in numerous ways. Cooking was by stone boiling, parching, baking, and broiling, and oftentimes two of these methods were used in preparing a single dish, for example, parching and boiling. 241 [252]

Whiting lists aboriginal cultivated food plants as corn, squash, tepary beans, lima beans, kidney beans, and Hopi sunflowers. Foods introduced include the peach, fig, apricot, plum, pear, apple, watermelon, walnut, and blackeyed pea. Other foods introduced but rejected or little used include the onion, chili, sweet potato, tomato, peas, almond, cherry, and wheat (1953, 88). 241 824 177

Most popular foods today still are corn, beans, squash, sunflower seeds, peaches, and figs. [241] 824

Wild plants utilized, according to Whiting, were the following: goosefoot, peppergrass, muttongrass, wormwood, tansy mustard, blanket flower, gilia, blazing star, pinyon, amaranthus, shepherd's purse, June grass, Indian millet, marigold, cat's claw, mescal, juniper, desert thorn, prickly pear, mesquite, squawbush, broad leaf yucca, Mormon tea, Lippia wrightii, salsa (unidentified), watercress, Indian pipe weed, and desert plume (1952, 103, 105, 106, 113, 114, 115). He reports that watercress was introduced. [177]

Preparation of Food

Grinding corn was one of the most laborious and time-consuming tasks a woman had to perform under aboriginal conditions, but women grind less now that they can obtain wheat flour and other commercially prepared food. A number of families have purchased handpowered machine grinders, and almost without exception these are preferred to the metate, because meal from the latter always contains grit. 252 [177]

A woman sits at her metate or grinding stone (pi'), her legs turned sideways beneath her, leaning slightly forward so that her weight is balanced over her knees as she reaches toward the far end of the stone. She has two sizes of hand milling stones (va-dji). Grasping the larger stone, she first uses an end of it to break the dry corn kernels (younger women may or may not use this method). The hand stone or mano is held in both hands for grinding, and the woman places a pile of corn on the end of the metate nearest her. The mano is moved away from the woman, and on each third or fourth backward stroke, a few more kernels are caught beneath it with a rocking motion and a slight pause in rhythm. The smaller mano is used on the same metate to reduce dry corn to a finer graininess or to crush green corn to a pulp. It is questioned whether the smaller size of the second stone is significant; it seems more likely that a harder, smoother texture of the stone itself is the pertinent factor. [516]

No attempt is made here to inventory recipes used by the Havasupai, but a few examples are described.

Soup or mush was one of the dishes most commonly prepared. It varied from a clear, watery consistency to a thick paste. Ingredients ranged from dry or green corn to crushed seeds of various wild plants, which might be boiled singly or combined in numerous ways. Soup or mush was eaten unseasoned, or flavored with salt, squash blossoms, or marigold. 252 262

Dumplings were made from dry corn, cooked to a thick paste, or from green corn shaped into balls and dropped into salted, boiling water.

THE HAVASUPAI

silis, and blankets is owned individually. Each one can dispose of his 422
possessions independently.

The Havasupai is an excellent horseman and packer. He usually 492
has quite a number of horses and does considerable packing on the trail with them. Traveling up and down the steep winding trail to the top of the canyon is very strenous work for the horses and the Indian must have a sufficient number of them so as to rest each horse for a few days after one of the trips.

When first visited by the white man these people dug holes with 241
stone hoes, planted their seeds, but did little cultivating. Only a small [512]
acreage was planted, this being irrigated from small ditches running from dams of rock, logs, and willows piled in the river. Methods of farming are still simple. The ground is first plowed and then cultivation is done with a hoe; some rotation of crops is practised from year to year. Irrigation ditches now serve over a hundred acres of land.

The Havasupai are among the most conscientious farmers in the [540]
Southwest. Their interest centers so firmly in their fields that when remunerative employment is to be had at Grand Canyon the men will leave the work with semi-monthly pay to plant and tend their crops. Planting begins in the middle of April, but previously the fields are cleared of weeds and brush, plowed with a one horse walking plow, and irrigated two or three days before planting.

The tools used are a planting stick about an inch wide and a foot 241
and a half long with one end cut wedge-shaped, and a modern hoe with 412
a blade at an angle to the handle. Formerly a wooden spade-shaped [537]
hoe with an extra long handle was used; also, the shoulder blade of a horse was held in the hands and used to scrape the sand out of irrigating ditches and for scraping out weeds.

Planting is an occupation that most of the family takes part in; 241
even the small children help dig holes. The corn is not planted deep, about three and one-half inches is the usual depth. The lines for the rows of hills are generally drawn with the foot. Kneeling, the first hole is dug with the planting stick; the soil is loosened, and eight or ten seeds dropped in. However, before putting the kernels in the first hole the planter says a prayer. Filling the hole, he takes two or three short steps forward, kneels, digs a second hole, and plants. This he continues until the field is planted.

The planting is not all done at one time but extends over a period of two months. Beans are planted on the same day as corn and placed half way between the corn hills. Both crops ripen about the same time.

When the young corn shoots are about two inches above the ground, they are given a second watering. When the tassels appear, about two and a half months after planting, the corn receives a third and last watering. The fields are weeded at regular intervals and traps are placed for rodents which would otherwise destroy a portion of the crops.

The Havasupai plant a small variety of corn, with ears about six [537]
inches long, known as Mohave corn, which will yield ears in about two months. Other varieties ripen at intervals from mid-August until the last of September. When the ears are ripe, they are gathered in burden baskets. The gatherer breaks off the ears and throws them in the basket on his back while he walks along. The corn is dried on the 251
roofs or on brush heaps. It may be placed in the storage chambers either in the form of husked ears or shelled and piled in a corner. Seed corn is always husked and heaped in a separate pile in a corner. Watermelon, pumpkin, sunflower, and squash seeds are dried, put in cloth sacks and stored in the storage chambers. Beans and corn ripen at the same time and those beans not eaten green are dried and stored in stone chambers for winter use.

The Havasupai have innumerable ways of preparing corn. Only 252

252a few are given here. Green corn is usually shelled or cut from the cob and mashed to a pulp on the grinding stone. Water is heated to almost boiling, the corn slowly added, and the mixture stirred with a stick while the pot remains on the fire. When it comes to a boil, it is set aside to cool. Green corn in the husks is roasted on a bed of coals or buried in hot ashes until the outer husks are charred. The husks are then pulled back and the ears tied in pairs by their husks and hung up until some relatives or friends come calling. The usual way of eating corn on the ear is to break off the kernels with the thumb nail, catching them in the palm of the same hand. A handful is poured into the mouth at a time. Often the pulp of green corn is shaped into balls, wrapped in husks, and baked in hot embers. When the husks are removed the balls are eaten as bread. Green corn is sometimes cut from the cob, crushed, and boiled with unripe pumpkin cut in small pieces. A favorite sweet dish is made by boiling squash blossoms until tender, then mashing them to a pulp on the grinding stones. Meanwhile green corn, cut from the cob, is cooking in a pot over a slow fire. The pulp is added to the corn and boiled until thick.

241 Squash does not ripen until October. It is gathered in burden baskets, brought home and piled up. Later the rind is cut off and the
251 seeds and center pulp scraped out. The flesh is cut out in strips and hung in the sun to dry. While still pliable it is made into bundles and dried thoroughly before it is stored for winter use. Squash prepared in this manner will keep indefinitely.

Fruit raised by the Havasupai is well known for its fine flavor. The women halve the ripe peaches and lay them out on the roofs or rocks to sun dry and then store them away for winter use. Figs are also dried. Some of the fruit is ground on the *metate*, pressed into large cakes and packed away.

251 Much of the beef and game is roasted and boiled while fresh, but
252 often it is dried to preserve it. The meat is cut in long thin strips and hung in the sun to dry. It is generally necessary to pound this jerky with a pestle before it is cooked and then it is commonly stewed with dried squash or corn. Bean flour also may be added to thicken the stew.

222 In addition to the cultivated crops, the Havasupai gather several
262 wild plants which are a valuable adjunct to the food supply during the winter residence on the plateau. The piñon nut forms an important part of their diet. In good years these nuts are gathered in large quantities during the fall and winter months by the women and children on the land high above the canyon. Some of the nuts are ground
252 on the *metate* into a paste resembling peanut butter.

272 A drink is made of dried mesquite pods. The pods are crushed on the grinding slab, stirred into water, and the mixture allowed to stand several hours, after which the drink is ready for use. A variety of
222 seeds—pigweed, goosefoot, and numerous others, are gathered and
252 utilized in various ways. Some are roasted on parching trays and ground and the meal added to boiling water and made into mush. Pigweed leaves are boiled in salted water and eaten like spinach; sometimes corn meal is added.

222 The mescal (the agave plant) is considered at the right stage for eating when the flower stalk, which shoots out from the center of the plant, is a few inches high. The plant is severed by pounding a chisel-shaped buckthorn stick or stone axe against its base. The outer leaves of the inverted plant are trimmed of their green portion with a hatchet or butcher knife. A party of several families goes out and gathers
252 mescal and brings it to the place where it is to be cooked. A pit which may vary in size but usually is about three feet in diameter and one and a half feet deep is dug in sandy soil, not in gravel because the steam would escape. Wood and brush are piled into the hollow to the height of a foot or more above the ground. Stones the size of a man's

6: Schwartz A-5 (1953) 1956
NT14 Plateau Yumans NT14
Havasupai

177 the last item to change. The English language has not even yet been
648 completely adopted; Havasupai is still spoken in the homes, at play,
[175] and at work. The present teacher (1954) has complained that, for this reason, the children forget most of their English vocabulary during the summer. English will be more widely used, however, with the increasing influence of schooling, the Saturday night cowboy movies, and the radios and phonographs.

A Havasupai village established by the Park Service near the Grand Canyon National Park settlement on the plateau now forms one of the main centers of Havasupai life and acculturation. The inhabitants work
[464] either for the Park Service or for some other white firm concerned directly or indirectly with the Grand Canyon tourist business. The cash
[439] income derived from this work and from the Havasupai's own tourist
[432] trade in the canyon has radically changed their food patterns. Now they are able to, and do, buy food in the tribal store, which stocks the standard commodities. It is doubtful that canned soup or Hershey bars played a very important role in the diet of the pre-reservation Havasupai.

177 While the crop assemblage has remained approximately the same
241 as that of the previous period, the farming methods have changed considerably. For example, a tractor is now used in the canyon to plow the fields. It was packed down the narrow trails piece by piece, as was the electric power plant which supplies current to the school and other government buildings.

177 The big flood of 1910, which washed out most of the farms and
[18] homes of the canyon, brought from the government relief in the form
648 of small wooden frame houses. Indirectly, this caused the extinction of the talus top granary. After the flood the old brush dwellings were rebuilt and the new frame houses were used for storage, since they were supposedly too cold in the winter and too hot in the summer for living purposes. A few individuals, however, have adopted the plan of the frame house and have built stone houses, using modern techniques. This form may become the common dwelling of the future.

177 The suspension of crematory activities also began soon after the
765 government invaded the canyon. The old pattern was gradually re-
648 placed by the extended burial, which is universally practiced today.

174 The acculturation of the Havasupai, which is by no means complete,
177 took place first by the diffusion of traits into the canyon through the Hopi and Walapai, then by the selected introduction of white culture through the government workers, and finally by individual contact with whites at the Grand Canyon National Park village and elsewhere. These processes have increasingly accelerated the change of an aboriginal people to potentially full-time participants in Anglo culture and society.

University of Oklahoma,
Norman, Oklahoma.

7:Spier E-5 (1918-1921) 1929
NT14 Plateau Yumans NT14
Havasupai

and northwestward the number is five, in the Southwest and Plains, four and seven, on the lower Colorado, four, in California at large, quite variable.

All in all, Havasupai culture is of the Basin type with some affiliations elsewhere in intangible culture; a few ritualistic elements link with the Pueblos, mythologic elements perhaps more with southern California. That the Havasupai link with other Western Rancheria peoples occasions no surprise since they are geographically one of them, but the striking observation is that in culture they conform equally to Great Basin characteristics. In fact, in the general simplicity of their culture and in the specific details of its elements, they are more clearly participants in Basin culture than in that of the western neighbors of the Pueblos.

In this the Walapai and Yavapai resemble them, so far as we know. Nor is this inexplicable, since all these are located peripherally to the Pueblo focus and at some distance, yet are relatively unaffected by the life of the lower Colorado. We must look upon the culture of these three tribes as representing an extension of the Basin area southward across the plateau of western Arizona.

It is not certain that such specific Pueblo elements as appear among the Havasupai were directly derived. Their attenuation suggests rather that they were derived from some intervening group, who in the light of known contacts, must have been the Navaho. The difficulty is that they may not have had contact with the Navaho before the middle of the last century, but it may also be that the traits are no older than that in Havasupai life. I have in mind here the few masked dancers and clowns, prayer plumes placed at springs, and the rather weak sentiment that dances are prayers for rain.

Agriculture among the Havasupai presents a somewhat different situation. This was their mainstay and as such makes them one with the Pueblos. Yet I am not certain that their concern and pride in their crops means that they have derived this attitude directly from the Pueblos. On the whole I am of the opinion that the intensity of a trait development is affected by neighbors'

7: Spier E-5 (1918-1921) 1929
NT14 Plateau Yumans NT14
Havasupai

attitudes, but in this case there seems to be environmental determination. The home of the Havasupai is the one rich oasis in all western Arizona. If we picture them as originally like the Walapai with but a moderate interest in cultivation, once they were settled in Cataract canyon the extension of agriculture was well-nigh thrust upon them.

II

It appears to me that there are two primary trains of thought flowing from the consideration of a tribe's cultural position, one culture-historical, the other relating to the conditions of culture growth. What I mean by the latter will, I trust, become clearer as I proceed.

One inquiry is as valuable as the other: I should not be inclined to eschew culture history reconstructions on principle as A. R. Radcliffe-Brown seems to do. But for an understanding of the nature of culture and the processes by which its forms come into being, it seems unnecessary to indulge in historical reconstructions of grand scope. Some of the recent attempts in this direction, noticeably those dealing with American cultures, impress a moderately conservative individual as being highly tenuous or even downright careless and frivolous. Furthermore, this type of reconstruction is unnecessary.

A specific example, which is by no means extreme, is Kroeber's placing of girls' adolescence rites in California in an ancient cultural substratum.[6] His argument rests on the universality of the rites in that area despite its cleavage into several distinct culture provinces. Other traits having a much narrower distribution, such as the boys' initiations in the south and the Kuksu cult in central California, are in his opinion much more recent institutions. One might reaffirm Kroeber's opinion concerning girls' rites by pointing out that they are universal not only in California but throughout the Pacific coast from Alaska to the Southwest, whereas they are lacking to the east. We may at least assent that

[6] The History of Native Culture in California. Univ. Calif. Publ. Am. Arch. Ethn., 20: 123-142, 1923.

stream into ditches with a speed of flow sufficient to divert a considerable amount of water. It is then carried through the village and into the fields. Most of the irrigation canals are simply small ditches dug in the sand, banked slightly on the sides. The main ditches are as much as two feet deep and three feet wide, but the laterals are much smaller. These are dug from the main ditches to the individual garden plots which may then be watered as necessary. Each field is divided by long mounds of earth into sections which are watered one at a time by letting the excess from one into the next until the entire field is well soaked. Whenever the water must be carried across the mouths of side canyons where ditches would be frequently washed out in storms, small aqueducts have been constructed with piping and cement. The Indian Service has made plans to install new diversion dams and three new aqueducts with permanent footings at a cost of many thousands of dollars. The old system is a primitive one, but it has stood the test of time, for the Havasupais have been irrigating for centuries. 312 241 312

In preparing the fields for the first planting in April, the old buckthorn planting stick as an agricultural tool has given way to the plow, scraper, harrow and disc as well as shovels and hoes. Most of this equipment, along with several cultivators, mowers and one tractor, belongs to the Tribal Council which rents it out for services or money. Unfortunately, most of these tools are badly cared for since the Havasupais seem to have little mechanical ability. Men, women and children plant, but the men do most of the field preparation, irrigation and fence building and repair. The age old prayer at the first planting is still a very important part of this spring activity. 241 [412] [177] [655] [463] [782]

The more than 280 Havasupais speak a dialect which, along with that spoken by the Walapais, the Yavapais and the Tonto, has been classified as the eastern division of the Yuman stock. Havasupai and Walapai are particularly close, the dialects being no more different from each other than are "Bostonian" and "Brooklynese." The cultural affinities of these two groups are equally close and their members live comfortably in each other's midst and frequently intermarry. 197 [101]

Physically the Havasupais bear a close resemblance to the Indians of the Lower Colorado. They are of medium to short stature and inclined to fatness. Their complexions are relatively light and they smile easily and winningly. 142

181 and winningly. It would not be an overstatement to call these people easy-going. Unpleasantness arises occasionally here as it does wherever human animals live together, but in Supai it seems of a less offensive nature. It is peaceful place where people are loathe to interfere in each other's affairs, yet ready to help when asked.

101 Leslie Spier once pointed out that culturally the Havasupais are closely associated with the tribes of the Great Basin. This is especially true of the material, economic and the social aspects of the culture. At the same time, these people are primarily agriculturalists like their eastern neighbors, the Pueblos. This places them in a distinctly intermediate cultural position.

221 In aboriginal times, when the tribe was often smaller than it is today,
[161] early spring found the Havasupais returning to Cataract Canyon from the plateau where they had spent the winter hunting and gathering piñon nuts and other wild seeds. The spring planting was done and the dirt covers on their houses repaired. It was at this time that much of the food, which had been dried and stored the year before, was eaten.

[361] During the summer everyone lived in the canyon, though trading
[439] expeditions were often sent out to neighboring tribes. When the corn
[527] and peaches ripened in September, the harvest was taken in and a dance
[648] held to which Walapais, Navajos, and Hopis were invited.

221 By the middle of October an exodus of families and groups of families
361 began and within a month the entire population moved up to the cedar thickets on the plateau where semi-permanent camps were established and once more the winter activities began. This annual cycle has changed considerably, however, in the past half-century.

177 The food-getting economy of today is no longer divided between the
221 spring and summer agriculture and the hunting and gathering of fall and
241 winter. There is a concentration by both men and women on agriculture and remunerative employment on the plateau. This makes it possible for families to depend on food purchased from the store as well as that which they grow. The hunting and gathering aspect of their economic life has been nearly given up, making the seasonal migrations unnecessary. The
[361] village is now the center of activity throughout the year.

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An old-style conical house with a cooking shelter in front.

342 they are cooler in the summer and can be kept warmer during the cold weather. Many of these old-style houses are conical in shape but most of them are longer than they are wide and have sloping roofs of dirt which nearly reach the ground on either side. Very few of them are made of stone.

● 241 In passing through this wide part of the canyon one may see a great many small fields. Most of them are planted with corn but close examination shows that growing in the same fields between the corn plants are beans, squashes, pumpkins, sunflowers, watermelons, tomatoes and potatoes. Many of these plants were introduced after white contact, of course, and among them are the fruit trees which stand in orchards in some parts of the canyon and grow along the trails everywhere. Peaches, apricots, figs, pears, and apples are now part of the standard diet in Supai and even pecans, plums and pomegranates are grown.

[177]
[245]

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maps the San Francisco mountain is represented as belonging to the continuous Mogollon chain, which comes from the east southeast, and was called Sierra de los Cosninos, the name of a tribe of Indians inhabiting this region. I am under the impression that Leroux, the early explorer in that part of the country was finally murdered by the Cosninos, but I do not remember that the account has ever been printed." Whipple also refers to the "Cosnino caves," remarking that "the Cosnino caves had been plastered with mortar, showing more artistic skill than is practiced by the present occupants of the country" (*loc. cit.*, p. 15). And again on page 19 he goes to show that, taken collectively, the Pontos, Cosninos, and Yampais together number 6,000 souls; of these 2,000 were Yampais (p. 17). But all this is very brief and unsatisfactory. 195 114

Capt. John G. Bourke in his work on "The Snake-dance of the Moquis of Arizona" (1884), says, "At Keam's ranch we met Mr. Alexander Steven, a bright Scotchman who during the past 12 years has had considerable experience as a metallurgist and mining prospector in Nevada and Utah. He gave me a thrilling account of his journey westward to the country of the Cohoninos, a tribe of Indians living in the cañon of Cataract Creek, near its junction with the Grand Cañon of the Colorado in this Territory.

"They number only from forty to fifty warriors, live in the cliffs in winter, and build 'wickyups' or sapling lodges in summer. They say that the Hualpais (Wolapais), Apache-Mojaves, and themselves are all one people—Cohoninos—but that *their* proper designation is the "Ah-Supai. 175 101 [342] 175

"They raise an abundance of finest peaches, good corn and melons, [241] and weave unusually fine and beautiful baskets. They are great hunters, and eke out a living by trading off buckskins, and sometimes mountain lion pelts, to the Moquis, Navajos, and Apaches. [285] [439]

"The cañon in which they dwell is 4,500 feet deep, and is that of the Cataract Creek, a strong body of clear water tumbling by a series of cascades into the Grand Cañon of the Colorado, 1,500 feet still deeper, and separated from their village by a series of blood-curdling precipices and chasms" (pp. 80, 81). Captain Bourke, in speaking of the Moquis, says further, that "Intimate commercial relations are maintained with the Cohoninos or Ava-Supais on the west (*loc. cit.*, p. 254). [33] [439]

In a lecture before the National Academy of Sciences, delivered in Washington, April 22, 1882, Mr. Frank H. Cushing in referring to the Zuñians said, "Interesting among the hero-gods is the great priest of all religious orders save that of the bow, *Poshai Anâ'ia*. In the days of the new, yet not until after men had begun their journey toward the east, he is supposed to have appeared among the ancestors of the Zuñis, the Taos, the Coconinos, and the Moqui Indians, so poor and ill-clad as to have been ridiculed by mankind." This lecture was afterwards published in The Popular Science Monthly, of New York (1882, p. 191). 114 193

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175 Mr. Cushing's best account of these people, however, is published in another connection, wherein he relates how he made a long and dangerous journey from Moqui to the Supai Cañon.*

Following his description of hazardous descent into that fearful gorge, Cushing goes on to say in his article, that "the first Ha-va-su-pai I saw
[291] may be taken as a type of his race. But lightly clothed, a strange close head-band around his temples, he swiftly passed from one bush to another as we we emerged from the little grove. Below us stretched a
[133] green, moist plain of sandy soil, nearly two miles long by half a mile at its greatest width. We could catch only occasional glimpses of it through the rank growth of willows, the leaves of which everywhere brushed our heads as we rode along the river trail; these glimpses,
[241] however, revealed numerous cultivated fields of corn, beans, sunflowers, melons, peaches, apricots, and certain plants used in dyeing and basket making, and usually carefully protected by hedges of wattled willows
[312] or fences of cottonwood poles. Everywhere these fields were crossed and recrossed by a net work of irrigating canals and trails. Here and
[342] there were little cabins, or shelters, flat-roofed, dirt-covered, and closed in on three sides by wattled flags, canes, and slender branches, while the front was protected by a hedge like those of the fields, only taller, placed a few feet before the house, and between which and the house burned smoky fires."

"The houses were always nestled down among the thick willows
[361] bordering the river, or perched on some convenient shelf, under the shadows of the western precipice. In several places, within some of the great horizontal cracks of these western cliffs, and often high up, were little buildings of stone laid in mud plaster, and not unlike the cliff dwellings we had observed on the way down, and of which ruins exist in almost every cañon throughout the great southwest."

"When we again caught sight of our Kuhni, in a little opening near the trail, he was evidently uncertain whether to run forward and warn the tribe—whose voices, mingled with the barking of dogs and the murmuring of the river, could be heard below—of our coming, or wait to greet us. Finally, he shouted in a rapid, gurgling, soft sort of language, that the villagers were coming; and then, with sort of a questioning smile, turned toward us, keeping up a ceaseless gibberish, but eyeing me closely, and evidently thinking me the most curious member of the
114 175 party."

The only other facts of importance given in this narrative are that
[756] those Indians have their medicine men and use the "sweat house," a
[515] plan of treatment seen among many other tribes. They have a great
[231] number of dogs about their village, and many of the families are blessed with from five to six children. They are, so far as the writer is aware,
[648] upon excellent terms of friendship with the whites. I am not aware

*Cushing, Frank Hamilton. "The Nation of the Willows." The Atlantic Monthly, September, 1882, pp. 362-374. The quotation I make is from page 374.

The Nation of the Willows.

I

291 The first Ha-va-su-pai I saw may be taken as a type of his race. But lightly clothed, a strange close head-band around his temples, he swiftly passed from one bush to another as we emerged from the little grove. Below us stretched
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[previous portion of this article not processed]

304 in the pulling out of the beard, although
302 whiskers are sometimes permitted to grow in front of the ears; beside occasional mustaches, faint goatees are affected by the young. Scarifications, for ornaments, are not unknown.

515 The women, both old and young, are remarkably careless of personal cleanliness and appearance, nor are the older men superior to them with reference to cleanliness. The young men, however, are noticeably neat in the care of their persons, frequently bathing in the river, and careful of their toilet and dress.

●241 I have mentioned the things which are cultivated by the Ha-va-su-pai. On these, as on various roots, wild plants, and fruits, they depend for their vege-
252 table food. Green corn is variously
262 prepared: it is roasted, or boiled in the ear; or cut up and cooked with beans, bits of deer suet, etc., it forms the succotash of the more eastern tribes, and
[412] of historic celebrity. Crushed on a metlatl with a little flat grinding-stone or muller, together with green squashes, so as to form a pulp, it is then boiled, when it becomes gelatinous, resembling the *poi* of the Sandwich Islanders. Like it, also, it is eaten with the two fingers. Sunflower seeds, toasted by being shaken together with live coals in an earth-covered basket tray, then ground, formed into patty-cakes, and slightly baked in the ashes, are eaten as a relish with these and other dishes, in the absence of meat. Indeed, this curious sunflower food takes the place, to a great extent, of meat during the summer months.

251 The corn, while still green, is sometimes prepared for storage, by being roasted, husks and all, in hot sand, while the ripened corn is merely dried on the ear. Food is made of the latter, either
252 by simply parching, or by grinding into meal. The meal, coarse or fine, is then used for samps, mushes, or batters, and cakes, thick or thin, and of many varieties and degrees of wholesomeness.
[262] Melons, pumpkins, peaches, and apricots
[P-549A]

412 spades, and picks, of wood, bone, horn, or iron, — the last procured by trade, — are used, as well as the universal *kä-ta*, or digging stick. In planting, the long [241] prod or spud of cedar is used, a convenient branch being left short near the lower end, with which the implement is pressed down with the left foot.

492 Within the past few years the introduction of horses among the Ha-va-su-paí has necessitated rude saddles, bridles, whips, spurs, lassos, and hobbles. [177] Among these things, only the bridles and spurs sometimes differ from those of other Southwestern Indians. An efficient though extremely primitive bridle is made of a little hard-wood stick, a small strap of buckskin being attached to either end of it, and passed tightly under the chin of the animal; and two long thongs of light material serve as reins. Equally primitive is the spur. It is made from a fork of some hard, elastic wood, the stems of which are fastened to either side of the foot, and the base sharpened into a sort of prod.

411 Their weapons in war and chase are rude, knotty clubs of hard wood; pikes about four feet long, of the same material, sharpened and hardened at the point in the fire; beautifully finished bows and arrows, both wooden and iron tipped, and somewhat longer than those in use among the Pueblos. Slings were [526] formerly used, although now only to a limited extent, being principally seen as toys or playthings of the children. It seems almost paradoxical that the Ha-va-su-paí — least acquainted with civilization perhaps, of any Indians in the [177] United States — should universally possess repeating rifles of the most improved models and an abundance of ammunition. Destructive alike of life on the one hand, and of primitive defensive usages, on the other, the gun has not, however, displaced the ruder weapons which I have described.

611 A most curious fact, and a very significant one in the consideration of the
614 [P. 550 B]

The /99 cont./
131 inaccessibility of their cañon home has tended to keep them
177 immune from outside influences, so that in many ways their
life is still delightfully primitive. Their typical dwelling
342 consists of a framework covered with brush or tule and sometimes with an outer covering of earth. In summer a four-post brush shelter is erected, which affords protection from the sun and allows free circulation of air.

262 The agave plant, cut and prepared in much the same way as by the Apache, has always been an important article of food among these people. Other native vegetal foods are grass seeds
224 and piñon nuts. From time immemorial the Havasupai have
[221] been hunters. On the approach of winter they left the cañon for the upper levels, built wickiups of boughs and bark, and spent the cold season in hunting. Deer were the principal game, although they killed some mountain sheep and an occasional black
[251] bear. Much of the venison was cut in thin strips and dried for
237 summer use. Deerskin dressed by the Havasupai was considered
281 the best by all neighboring tribes; consequently, it not only
[439] furnished clothing, but was an important medium of barter. But the life of the Havasupai has changed. Game is scarce, and
177 224 the Government does not willingly grant them permission to
648 hunt on the surrounding mesas, hence there is little wonder that the wrinkled veterans long for the old days when game was plentiful and they hunted where they would. "Now all is changed," they say. "We cannot go out of the cañon without asking the white man. We dare not hunt deer, as the game must be saved for the Háiko. We are no longer men; we are like little children; we must always ask Washington!"

241 Corn is now their chief staple, besides which they raise
262 beans, squashes, melons, pumpkins, sunflowers, peaches, apricots,
171 and figs. They prepare corn in countless ways, corresponding
252 largely to those of the Hopi. In fact, the modes of preparing corn by all tribes of /100/ the Southwest are much the same. Much of the crop is allowed to ripen on the stalk; this is later ground into meal on the metate. Quantities of green corn are harvested, roasted in large pits with the husks on, and hung to dry. This may be ground or simply shelled and cooked, either alone or with beans, meat, and dried squash. Like the figs, their

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243 CEREAL AGRICULTURE--specialized cultivation of cereal crops (e.g., maize, millet, rice, wheat); techniques of planting and harvesting (e.g., transplantation, threshing); use of specialized tools, equipment, and machinery; organization of labor and production; etc. See also:

Milling industry . . . . . 586 Harvesting and threshing machinery 407

1:Spier E-5 (1918) 1928
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312 tion ditches because the sand in which they are built is so light that they easily break.

The main ditches are perhaps two to three feet deep; the others are quite shallow. The ditch system is not complex because most fields that are irrigated lie directly under the main ditches; others are fed by a few laterals. Maintenance of the dams and ditches is not a community affair, but devolves on those whose fields are supplied by the particular dam or ditch. They are dilapidated most of the time, being repaired only as needed. This is to be expected because the material is so light as to wash out easily and it would be futile to keep them up when not in use. There is no set regulation for the use of the water. The supply is large, the need is small, and apparently there is little friction over [578] rights to its use. Yet quarrels have arisen from this source.

241 Planting is a family occupation, even the children helping to dig 592 holes. Garcés says:—

> I had much complacency to see that as soon it was dawn each married man with his wife and grown sons went forth to till his milpas, taking the necessary implements, as hatchets, dibbles (coas), and hoes, all of which they procure from Moqui.[1]

As a rule each family plants as much corn as possible. Corn, beans, and squash are the staples, the year-round food. Corn (*teyâ'dj*) is not planted 243 deep; 5 to 7.5 cm. being usual. Straight lines for the rows of hills may be drawn with the foot; their orientation is immaterial. Kneeling, the [412] first hole is scratched with the planting stick (*hudlid*) in the manner of a canoe man wielding his paddle. This is a buckthorn branch (*Condalia lycioides* var. *Canescens* (Gray) Trel.), 2 cm. in diameter, 65 cm. long, with one end cut wedge-shaped.[2] The soil is loosened to a depth of 20 cm. and eight or ten kernels dropped in. Before putting the corn in the first hole, the planter prays:—

[539]	mêdjpâk	teyâdjmehâna	owi
	growing	corn good	I do it.

"Grow good: when your stalk grows, grow tall: grow like the mythic corn." Then he drops the kernels into the hole and chewing another, blows it toward the mythic corn, two white marks high on the canyon wall. These represent the two original ears given by the twin culture heroes.[3] Filling the first hole, he takes two short steps forward, kneels, and digs a second, and so on. The second row parallels this

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[114] [1] Coues, 345. A later statement (438), that tribes upstream from the Mohave look crops, must be taken to mean that the Walapai and Hayocopai had less than the Mohave.

[2] Cushing, (a), 500, notes the use of a planting stick provided with a footrest, but my informants denied this.

[171] [3] The Zuñi also pray at the first planting (Cushing, 6b), 178–179).

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with holes opposite those in the first. (Actually the spacing is not very regular). Thus groups of plants grow about a meter apart in both directions. Fields are irregular in outline. Several men might plant one field, the others following the leader's spacing. They do not repeat the invocation. The land is irrigated about two days before planting. They begin to plant in the middle of April and finish two months later; the precise time depends on a man's whim. If corn is planted in the middle of May the shoots will appear after four days, but later planting requires five days. In a month it is half a meter high; it then receives a second watering. When the tassel appears after two or two and a half months it is given a third and last watering.[1] The attention required by the growing crop is not burdensome; of course the fields must be weeded, traps placed for the ground squirrels and rats who would otherwise uproot the corn, etc. The hoe is a wooden spade-shaped affair with a disproportionately long narrow blade with a handle in the same plane. This is used to scrape up the sand into ridges when irrigating and for scraping out weeds. The shoulder blade of a horse (never a deer) is also used for the latter purpose: this is held in the hands, not hafted. The corn ripens in about four months. Plants bear two and sometimes three ears to the stalk. Only the ears are collected, although the stalk with the ears attached is sometimes taken (for fodder?).

According to Sinyella there were only two varieties of corn before he was married (1860–70), then others were acquired from the Hopi. These two were *teyá'(j)pa*", with kernels mostly red with a little white, and blue corn, both of which, but particularly the first, are ascribed to the culture heroes. The modern varieties recognized are white, red, yellow, black, white and red (*a„mauighuaulá*), white and blue (*a„mad'ágwaá*), all of which are named by color, and black and white (*a„ǵéld*, spotted). A very small variety (*Zea araplacea*), with ears about 12 cm. long, known as Mohave corn, is also grown, yielding ears in two months. These have been traded from the Mohave through the Walapai. The blue corn is planted first, because it ripens quickly. Each color is planted alone in a field, even in a large field which is given over to several varieties. The colors of adjacent varieties mix, but no reason is offered for this. One color is not preferred above another for its taste, but wafer bread is made of either white or blue, but not of mixed corn. Long, well formed ears are selected for seed. About twenty such are said to be needed to seed an acre, but this does not seem enough.

[1] Mr. Cummins, a first-rate farmer, tells me that this system of irrigation is proper; corn planted in late May matures in sixty to seventy-five days.

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[252] Corn is gathered in all stages of ripeness: the first edible ears are welcomed after the winter's dry provender. Green corn is boiled, made into bread, etc. Green corn may be partially roasted in the husk by placing it in a roasting pit over night. The husk is stripped off and the corn dried. Such ears are boiled during the winter, when they have the taste of fresh corn. When the the ears are ripe and hard the crop is gathered by the men and women who planted it, with the assistance of any one who is willing to help. A woman breaks off the ears as she walks along, throwing them into the burden basket on her back. The corn is spread to dry in the sun, either on the roofs of the rectangular shades, against which ladders conveniently lean, or on heaps of brush around which little smudges of dung are built to scare off rodents. Corn is placed in the stone storage chambers either in the form of husked ears or it is shelled and heaped in a corner. Seed corn is husked and placed in a separate pile in the storehouse. Pumpkin, squash, watermelon, and sunflower seed are selected for sweetness, dried, bundled in a cloth, and set to one side in the chamber. When going up to the plateau for the winter, two small sacks of corn are carried along: they return for more as it is needed. The corn may be stored in three chambers: that in the first is eaten during the winter, that of the second during the spring planting period, and of the third, only a little may be eaten, not all. "We don't eat it all: we don't plant it all." This remainder is saved against the contingency
[731] of flood, etc.

Sinyella has five storehouses convenient to his fields; these were all emptied of the previous year's crop by the end of September. His family (p. 113) did not plant much this year as they have no women to grind their corn, so that only one storehouse will be filled. This is intended to supply himself, his four adult sons, and the five grandchildren. If this proves insufficient, more will be given them without compensation by Wat, his younger brother's son, who has plenty this season. Jim, who plants in his parents' field, stores his corn with theirs.

244 In former days two kinds of beans (*mtdipi*) were raised, one a big red variety, the other yellow. These were planted in the cornfields on the same day as the corn, placed midway between the cornhills, 10–12 cm. deep, four to a hole. Both crops ripen at the same time. Surplus
[251] beans are also stored in the stone chambers for winter food, leaving enough to plant in the spring.

Squash (*hamsit'*) is planted like beans, at the same depth, four seeds to a hole. Two varieties were known in Sinyella's boyhood, one large and round, the other long. Squash ripens in October. It is brought home by burden baskets full and piled up. The rind is hacked off with a
251 knife and the squash set aside to dry somewhat. The stem end is cut

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Mamie Chickapaniga has a right to be proud of her corn field for it is the hub around the much smaller corn.

133 Perhaps a mile downstream from the point at which the canyon spreads out to make room for the village, it quickly narrows once more. It is here that the first of three magnificent waterfalls may be seen. By this time Cataract Creek is the size of a small river and has become brilliantly blue. Carbonates of lime, which become more concentrated as the stream flows along, give it this color. The breath-taking, snowy-white falls plunging as far as 220 feet over vermilion cliffs into turquoise pools is a sight which no one who has seen it will ever forget. Though these falls are only a mile or so below the village, it is strange but true that several of the women who are middle-aged or older and have lived here all their lives, have never taken the trouble to see them.

312 Cataract Creek beautifies this canyon to be sure, but probably the most vital use to which the water is put is that of irrigation. Above the village two log and brush diversion dams scoop water from both sides of the